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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/696,436	10/24/2000	Ted J. Cooper	80398.P350	3904

7590 01/19/2007

Blakely Sokoloff Taylor & Zafman LLP
12400 Wilshire Boulevard Seventh Floor
Los Angeles, CA 90025-1026

EXAMINER	
YE, LIN	
ART UNIT	PAPER NUMBER
2622	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/19/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	09/696,436	COOPER, TED J.	
	Examiner	Art Unit	
	Lin Ye	2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 November 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/15/2006 has been entered.

2. Applicant's arguments with respect to claims 1-20 filed on 11/15/2006 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-16, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Acharya et al. U.S. Patent 6,108,453 in view of Kamei et al. U.S. Patent 5,528,698 and Ratakona U.S. Patent 6,307,569.

Referring to claim 1, the Acharya reference discloses in Figures 1, 5 and 7, an image processing method comprising: capturing a raw image (camera 730 obtains a raw images, see Col.4, lines 65-67); and providing edge enhancements to increase edge detail of the captured raw image as part of a demosaicing process (e.g., performing image edge enhancements on the captured raw image prior to forming full color pixels through color interpolation as part of a demosaicing process, see Col. 5, lines 5-16, lines 64-67 and Col. 6, lines 1-7; the Enhanced image 510 as shown in Figure 5 with better detail, such as sharper edges and less noise, see Col. 4, lines 20-25, and Col. 6, lines 12-13). However, the Acharya reference does not explicitly show using a brightness map of the captured raw image for edge enhancements, wherein the brightness map comprises luminance values extracted from the captured raw image.

The Kamei reference teaches in Figures 3 and 6, an image processing method comprising: using a brightness map (intensity or luminance map) of the captured raw image for edge enhancements (See Col. 6, lines 14-19), wherein the brightness map comprises luminance values (gray scale values) extracted from the captured raw image (e.g., translates captured raw image into a grey scale image or a histogram of pixel intensity, See Col. 5, lines 28-30 and Col. 9, lines 24-25). The Kamei reference is evidence that one of ordinary skill in the art at the time to see more advantages image processing method using a brightness map of the captured raw image for edge enhancements, wherein the brightness map comprises luminance values extracted from the captured raw image so that the edges are distinguished, and the angles of the edges are determined more accurately and easily (See Col. 5, lines 49-62). For that reason, it would have been obvious to one of ordinary skill in the art at the time

of invention to modify the image processing method of Acharya ('453) by using a brightness map of the captured raw image for edge enhancements, wherein the brightness map comprises luminance values extracted from the captured raw image as taught by Kamei ('698).

The both Acharya and Kamei references do not explicitly show the brightness map is approximated from a bi-linear interpolation of raw image.

The Ratakona reference teaches in Figures 2 and 6, the brightness map (grey-scale or luminance component information) is approximated from a well-known simple spatial interpolation scheme, such as bi-linear interpolation of raw image (Col. 6, lines 1-19 and Col. 7, lines 62-65). The Ratakona reference is evidence that one of ordinary skill in the art at the time to see more advantages image processing method using a brightness map of the captured raw image for edge enhancements, wherein the brightness map is approximated from a bi-linear interpolation of raw image so that the edge and non-edge locations in the image can be determined more accurately to be compatible with human visual system. For that reason, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the image processing method of Acharya ('453) by using a brightness map of the captured raw image for edge enhancements, wherein the brightness map is approximated from a bi-linear interpolation of raw image as taught by Ratakona ('569).

Referring to claim 2, the Acharya, Kamei and Ratakona references disclose all subject matter as discussed in respected claim 1, and the Acharya reference discloses performing post demosaicing processing on the captured raw image (e.g., the color interpolation processing, noise removal or other image enhancement processing are considered as post

demosaicing processing in the image processing circuit 732, see Col. 9-35); and outputting the processed image to display devices (720).

Referring to claim 3, the Acharya, Kamei and Ratakona references disclose all subject matter as discussed in respected claim 1, the Kamei reference discloses wherein providing the edge enhancements includes: creating a brightness map of the captured raw image (e.g., the image processing method of Kamei creating 256 gray scale image or a histogram of intensity of image; and the Acharya reference also discloses the pre-enhancement map 330 of the captured raw image contains the pixel intensity values considered as a brightness map, see Col. 4, lines 1-4).

Referring to claim 4, the Acharya, Kamei and Ratakona references disclose all subject matter as discussed in respected claim 3, and the Acharya reference discloses wherein providing the edge enhancements further includes: detecting edges of the captured raw image using the brightness map (e.g., See Kamei's Col. 6, lines 14-19); creating a mask image (approximated image 320) form the edge detected brightness map (See Col. 3, lines 60-67); and performing unsharp edge enhancement from the masked image (e.g., due to the effectiveness of the smoothing performed as unsharp edge enhancement, the approximated image is slightly blurred, the edge definition will not be as great as the raw imager 310).

Referring to claim 5, the Acharya, Kamei and Ratakona references disclose all subject matter as discussed in respected claim 4, and the Acharya reference discloses wherein providing the edge enhancements further includes: blending multiplicatively the unsharp edge enhanced image (approximated image 320) with the brightness map (410) as shown in Figure 5.

Referring to claim 6, the Acharya reference discloses in Figures 1, 5 and 7, an apparatus comprising: an image capturing device capturing a raw image (camera 730 obtains a raw images, see Col.4, lines 65-67); and a processor (processor 712, see Col. 5, lines 55-62) to provide edge enhancements to increase edge detail of the captured raw image as part of a demosaicing process (e.g., performing image edge enhancements on the captured raw image prior to forming full color pixels through color interpolation as part of a demosaicing process, see Col. 5, lines 5-16, lines 64-67 and Col. 6, lines 1-7; the Enhanced image 510 as shown in Figure 5 with better detail, such as sharper edges and less noise, see Col. 4, lines 20-25, and Col. 6, lines 12-13). However, the Acharya reference does not explicitly show using a brightness map of the captured raw image for edge enhancements, wherein the brightness map comprises luminance values extracted from the captured raw image.

The Kamei reference teaches in Figures 3 and 6, an image processing method comprising: using a brightness map (intensity map) of the captured raw image for edge enhancements (See Col. 6, lines 14-19), wherein the brightness map comprises luminance values (gray scale values) extracted from the captured raw image (e.g., translates captured raw image into a gray scale image or a histogram of pixel intensity, See Col. 5, lines 28-30 and Col. 9, lines 24-25). The Kamei reference is evidence that one of ordinary skill in the art at the time to see more advantages image processing method using a brightness map of the captured raw image for edge enhancements, wherein the brightness map comprises luminance values extracted from the captured raw image so that the edges are distinguished, and the angles of the edges are determined more accurately and easily (See Col. 5, lines 49-62). For that reason, it would have been obvious to one of ordinary skill in the art at the time

of invention to modify the image processing method of Acharya ('453) by using a brightness map of the captured raw image for edge enhancements, wherein the brightness map comprises luminance values extracted from the captured raw image as taught by Kamei ('698).

The both Acharya and Kamei references do not explicitly show the brightness map is approximated from a bi-linear interpolation of raw image.

The Ratakona reference teaches in Figures 2 and 6, the brightness map (grey-scale or luminance component information) is approximated from a well-known simple spatial interpolation scheme, such as bi-linear interpolation of raw image (Col. 6, lines 1-19 and Col. 7, lines 62-65). The Ratakona reference is evidence that one of ordinary skill in the art at the time to see more advantages image processing method using a brightness map of the captured raw image for edge enhancements, wherein the brightness map is approximated from a bi-linear interpolation of raw image so that the edge and non-edge locations in the image can be determined more accurately to be compatible with human visual system. For that reason, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the image processing method of Acharya ('453) by using a brightness map of the captured raw image for edge enhancements, wherein the brightness map is approximated from a bi-linear interpolation of raw image as taught by Ratakona ('569).

Referring to claim 7, the Acharya, Kamei and Ratakona references disclose all subject matter as discussed with respected to same comment as with claims 2 and 6.

Referring to claim 8, the Acharya, Kamei and Ratakona references disclose all subject matter as discussed with respected to same comment as with claims 3 and 6.

Referring to claim 9, the Acharya, Kamei and Ratakona references disclose all subject matter as discussed with respected to same comment as with claims 4 and 8.

Referring to claim 10, the Acharya, Kamei and Ratakona references disclose all subject matter as discussed with respected to same comment as with claims 5 and 9.

Referring to claim 11, the Acharya reference discloses in Figures 1, 5 and 7, a machine-readable medium (RAM 711, see Col. 5, lines 20-30) that provides instructions, which if executed by a processor (processor 712, see Col. 5, lines 55-62), cause the processor to perform the operations comprising: capturing a raw image (camera 730 obtains a raw images, see Col.4, lines 65-67); and providing edge enhancements to increase edge detail of the captured raw image as part of a demosaicing process (e.g., performing image edge enhancements on the captured raw image prior to forming full color pixels through color interpolation as part of a demosaicing process, see Col. 5, lines 5-16, lines 64-67 and Col. 6, lines 1-7; the Enhanced image 510 as shown in Figure 5 with better detail, such as sharper edges and less noise, see Col. 4, lines 20-25, and Col. 6, lines 12-13). However, the Acharya reference does not explicitly show using a brightness map of the captured raw image for edge enhancements, wherein the brightness map comprises luminance values extracted from the captured raw image.

The Kamei reference teaches in Figures 3 and 6, an image processing method comprising: using a brightness map (intensity map) of the captured raw image for edge enhancements (See Col. 6, lines 14-19), wherein the brightness map comprises luminance values (gray scale values) extracted from the captured raw image (e.g., translates captured raw image into a gray scale image or a histogram of pixel intensity, See Col. 5, lines 28-30

and Col. 9, lines 24-25). The Kamei reference is evidence that one of ordinary skill in the art at the time to see more advantages image processing method using a brightness map of the captured raw image for edge enhancements, wherein the brightness map comprises luminance values extracted from the captured raw image so that the edges are distinguished, and the angles of the edges are determined more accurately and easily (See Col. 5, lines 49-62). For that reason, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the image processing method of Acharya ('453) by using a brightness map of the captured raw image for edge enhancements, wherein the brightness map comprises luminance values extracted from the captured raw image as taught by Kamei ('698).

The both Acharya and Kamei references do not explicitly show the brightness map is approximated from a bi-linear interpolation of raw image.

The Ratakona reference teaches in Figures 2 and 6, the brightness map (grey-scale or luminance component information) is approximated from a well-known simple spatial interpolation scheme, such as bi-linear interpolation of raw image (Col. 6, lines 1-19 and Col. 7, lines 62-65). The Ratakona reference is evidence that one of ordinary skill in the art at the time to see more advantages image processing method using a brightness map of the captured raw image for edge enhancements, wherein the brightness map is approximated from a bi-linear interpolation of raw image so that the edge and non-edge locations in the image can be determined more accurately to be compatible with human visual system. For that reason, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the image processing method of Acharya ('453) by using a brightness map of the captured

raw image for edge enhancements, wherein the brightness map is approximated from a bi-linear interpolation of raw image as taught by Ratakona ('569).

Referring to claim 12, the Acharya, Kamei and Ratakona references disclose all subject matter as discussed with respected to same comment as with claims 2 and 11.

Referring to claim 13, the Acharya, Kamei and Ratakona references disclose all subject matter as discussed with respected to same comment as with claims 3 and 11.

Referring to claim 14, the Acharya, Kamei and Ratakona references disclose all subject matter as discussed with respected to same comment as with claims 4 and 11.

Referring to claim 15, the Acharya, Kamei and Ratakona references disclose all subject matter as discussed with respected to same comment as with claims 5 and 11.

Referring to claim 16, the Acharya reference discloses in Figures 1, 5 and 7, an image processing device comprising: an image capturing device capturing a raw image (camera 730 obtains a raw images, see Col.4, lines 65-67); a memory device (disk 718, or memory 711, see Col. 5, lines 10-11, lines 55-57 and lines 63-64) to store the captured raw image; an output unit (display device 720 and adapter 716) coupled to the memory device as shown in Figure 7; and a processor (processor 712, see Col. 5, lines 55-62) to provide edge enhancements to increase edge detail of the captured raw image as part of a demosaicing process and to cause the enhanced image to be output is to the output unit (e.g., performing image edge enhancements on the captured raw image prior to forming full color pixels through color interpolation as part of a demosaicing process, see Col. 5, lines 5-16, lines 64-67 and Col. 6, lines 1-7; the Enhanced image 510 as shown in Figure 5 with better detail, such as sharper edges and less noise, see Col. 4, lines 20-25, and Col. 6, lines 12-13; and the

enhanced image output to the display devices 720 and 716). However, the Acharya reference does not explicitly show using a brightness map of the captured raw image for edge enhancements, wherein the brightness map comprises luminance values extracted from the captured raw image.

The Kamei reference teaches in Figures 3 and 6, an image processing method comprising: using a brightness map (intensity map) of the captured raw image for edge enhancements (See Col. 6, lines 14-19), wherein the brightness map comprises luminance values (gray scale values) extracted from the captured raw image (e.g., translates captured raw image into a gray scale image or a histogram of pixel intensity, See Col. 5, lines 28-30 and Col. 9, lines 24-25). The Kamei reference is evidence that one of ordinary skill in the art at the time to see more advantages image processing method using a brightness map of the captured raw image for edge enhancements, wherein the brightness map comprises luminance values extracted from the captured raw image so that the edges are distinguished, and the angles of the edges are determined more accurately and easily (See Col. 5, lines 49-62). For that reason, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the image processing method of Acharya ('453) by using a brightness map of the captured raw image for edge enhancements, wherein the brightness map comprises luminance values extracted from the captured raw image as taught by Kamei ('698).

The both Acharya and Kamei references do not explicitly show the brightness map is approximated from a bi-linear interpolation of raw image.

The Ratakona reference teaches in Figures 2 and 6, the brightness map (grey-scale or luminance component information) is approximated from a well-known simple spatial interpolation scheme, such as bi-linear interpolation of raw image (Col. 6, lines 1-19 and Col. 7, lines 62-65). The Ratakona reference is evidence that one of ordinary skill in the art at the time to see more advantages image processing method using a brightness map of the captured raw image for edge enhancements, wherein the brightness map is approximated from a bi-linear interpolation of raw image so that the edge and non-edge locations in the image can be determined more accurately to be compatible with human visual system. For that reason, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the image processing method of Acharya ('453) by using a brightness map of the captured raw image for edge enhancements, wherein the brightness map is approximated from a bi-linear interpolation of raw image as taught by Ratakona ('569).

Referring to claim 18, the Acharya, Kamei and Ratakona references disclose all subject matter as discussed with respected to same comment as with claim 16, and the Acharya reference discloses wherein the output unit is a display device (monitor 720) as shown in Figure 7.

Referring to claim 19, the Acharya, Kamei and Ratakona references disclose all subject matter as discussed with respected to same comment as with claim 18, and the Acharya reference discloses wherein the processor (712) is to perform post demosaicing processing (the color interpolation processing) on the captured raw image and to cause the image to be output to the display (720) (See Col. 6, lines 9-18).

5. Claims 17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Acharya et al. U.S. Patent 6,108,453 in view of Kamei et al. U.S. Patent 5,528,698, Ratakona U.S. Patent 6,307,569 and Lathrop et al. U.S. Patent 6,288,743.

Referring to claim 17, the Acharya, Kamei and Ratakona references disclose all subject matter as discussed in respected claim 16, and the Acharya reference discloses the camera (730) is a digital camera for capturing a sensor image of an object or scene (See Col. 4, lines 58-60). However the Acharya reference does not explicitly states the camera includes a CCD array.

The Lathrop reference discloses in Figure 1, a digital camera (10, See Col. 3, lines 5-32) comprising: a image sensor (CCD 16). The Lathrop reference is evidence that the digital camera using CCD as a image sensor to capture a image of an object or scene which is well known to one of ordinary skill in the art at the time the invention made so that captured image data can be easily digitized and stored in ma non-volatile image memory (See Col. 1, lines 10-15). For that reason, it would have been obvious to one of ordinary skill in the art to see the digital camera (730) including a CCD array sensor disclosed by Acharya.

Referring to claim 20, the Acharya, Kamei and Ratakona references disclose all subject matter as discussed in respected claim 19, except the Acharya reference does not explicitly states the other image enhancement processing executed after color interpolation as the post demosaicing processing is a white balancing processing.

The Lathrop reference discloses an imaging apparatus (digital camera 10) has a demosaicing processing (interpolate the Bayer pattern digital image data); and a post demosaicing processing (white balance, see Col. 3, lines 50-55) for a white balancing

processing. The Lathrop reference is evidence that one of ordinary skill in the art at the time to see more advantages the post demosaicing processing is a white balancing or other image processing so that the scene illumination can be estimate more accurately. For that reason, it would have been obvious to one of ordinary skill in the art to see the post demosaicing processing is a white balancing processing disclosed by Acharya.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lin Ye whose telephone number is (571) 272-7372. The examiner can normally be reached on Mon-Fri 8:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Ometz can be reached on (571) 272-7593. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Lin Ye
Primary Examiner
Art Unit 2622

January 16, 2007